**Conservation of Energy**

**6-5 The student will demonstrate an understanding of the law of conservation of energy and the properties of energy and work. (Physical Science)**

**6-5.1 Identify the sources and properties of heat, solar, chemical, mechanical, and electrical energy.**
**Taxonomy level:** 1.1-B Remember Conceptual Knowledge

**Previous/Future knowledge:** Students have been introduced to the concepts of sources of heat and how heat moves by conduction in 3rd grade (3-4.3 and 3-4.4). In 4th grade (4-5), students demonstrated an understanding of the properties of light and electricity. In 5th grade, students have been introduced the concept of matter being composed of very small particles (5-4.1) that can form new substances when they are mixed (5-4.7) and to the concepts of motion and position (5-5.2). Students will further develop the concept of energy traveling in waves in 8th grade (8-6.8).

**It is essential for students to** know that energy can be in many different forms. Students should know sources and properties of the following forms of energy:

*Heat energy*
- Heat energy is the transfer of thermal energy (energy that is associated with the motion of the particles of a substance).
- Remember that all matter is made up of particles too small to be seen (5th grade).
- As heat energy is added to a substance, the temperature goes up indicating that the particles are moving faster. The faster the particles move, the higher the temperature.
- Material (wood, candle wax) that is burning, the Sun, and electricity are sources of heat energy.

*Solar energy*
- *Solar energy* is the energy from the Sun, which provides heat and light energy for Earth.
- *Solar cells* can be used to convert solar energy to electrical energy.
- Green plants use solar energy during photosynthesis (6-2.7) to produce sugar, which contains stored *chemical energy.*
- Most of the energy that we use on Earth originally came from the Sun.

*Chemical energy*
- *Chemical energy* is energy stored in particles of matter.
- Chemical energy can be released, for example in batteries or sugar/food, when these particles react to form new substances.

*Electrical energy*
- *Electrical energy* is the energy flowing in an electric circuit.
- Sources of electrical energy include: stored chemical energy in batteries; solar energy in solar cells; fuels or hydroelectric energy in generators.

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*Mechanical energy*

- *Mechanical energy* is the energy due to the motion (kinetic) and position (potential) of an object. When objects are set in motion or are in a position where they can be set in motion, they have mechanical energy.
  - *Mechanical Potential energy: Potential energy* is stored energy. Mechanical potential energy is related to the position of an object. A stretched rubber band has potential energy. Water behind a dam has potential energy because it can fall down the dam.
  - *Mechanical Kinetic energy*: *Kinetic energy* is the energy an object has due to its motion. Mechanical kinetic energy increases as an object moves faster. A moving car has kinetic energy. If the car moves faster, it has more kinetic energy.

NOTE TO TEACHER: Other types of energy can also be classified as potential and kinetic, but 6th grade students are only responsible for kinetic and potential mechanical energy.

**It is not essential for students to** know the terms *chemical reactions* or *changes* for chemical energy. They also do not need to know about electrons associated with electrical energy. The concept of nuclear energy will be addressed in high school.

**Assessment Guidelines:**
The objective of this indicator is to *identify* the sources and properties of heat, solar, chemical, mechanical, and electrical energy; therefore, the primary focus of assessment should be to retrieve from memory sources and properties of the forms of energy listed. However, appropriate assessments should also require students to *recognize* forms of energy by their sources.